Fig 1

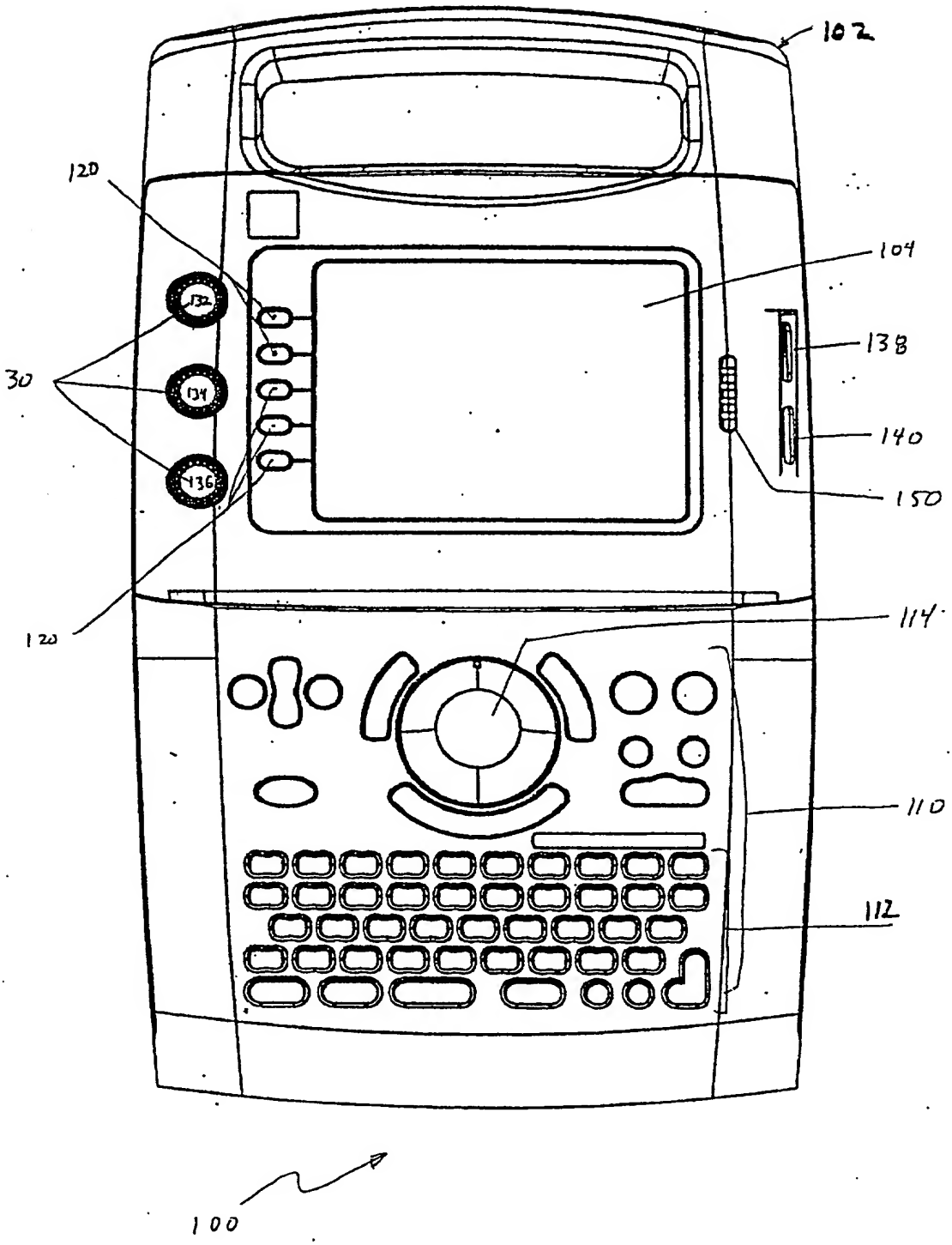
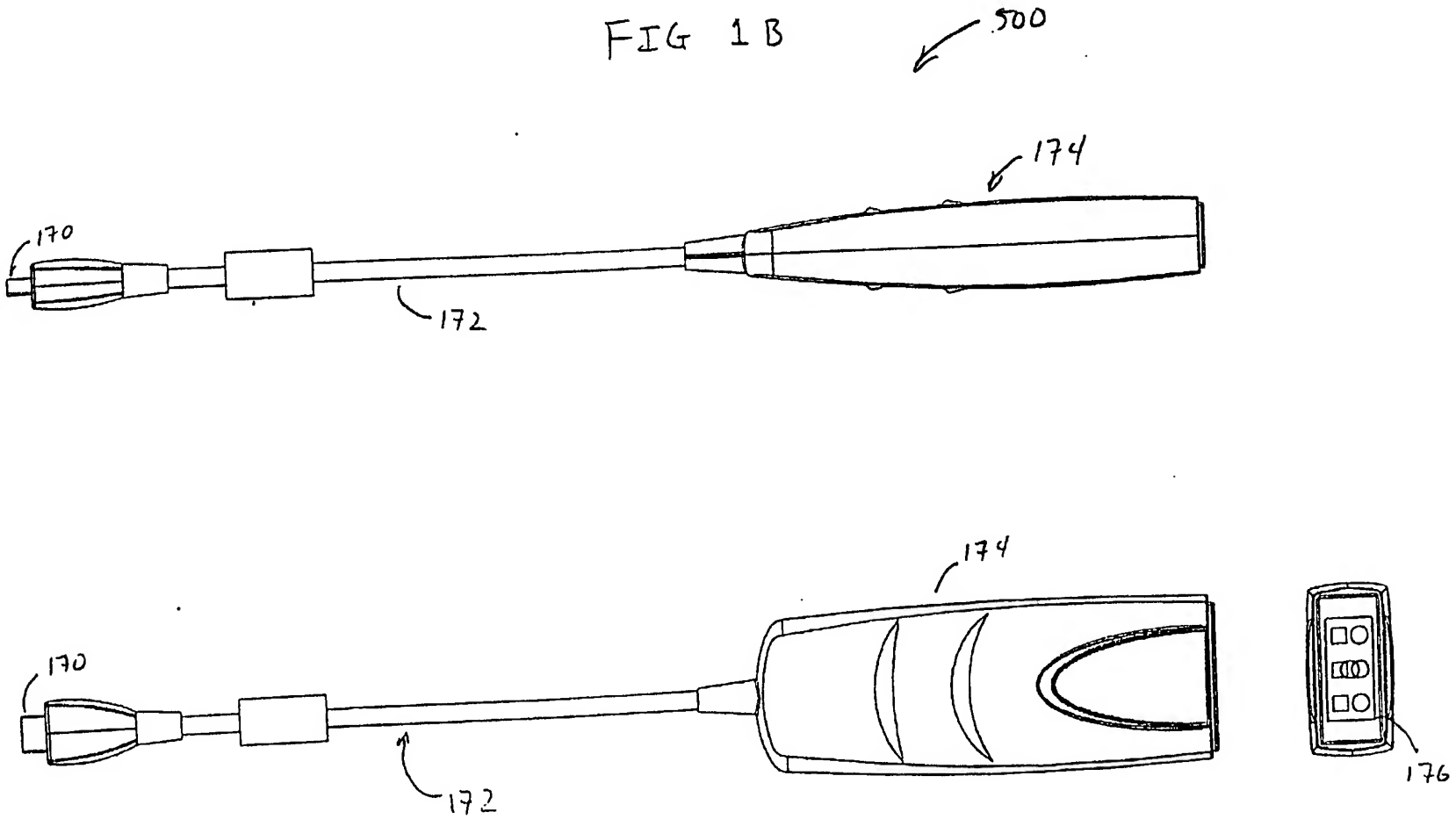


FIG 1B



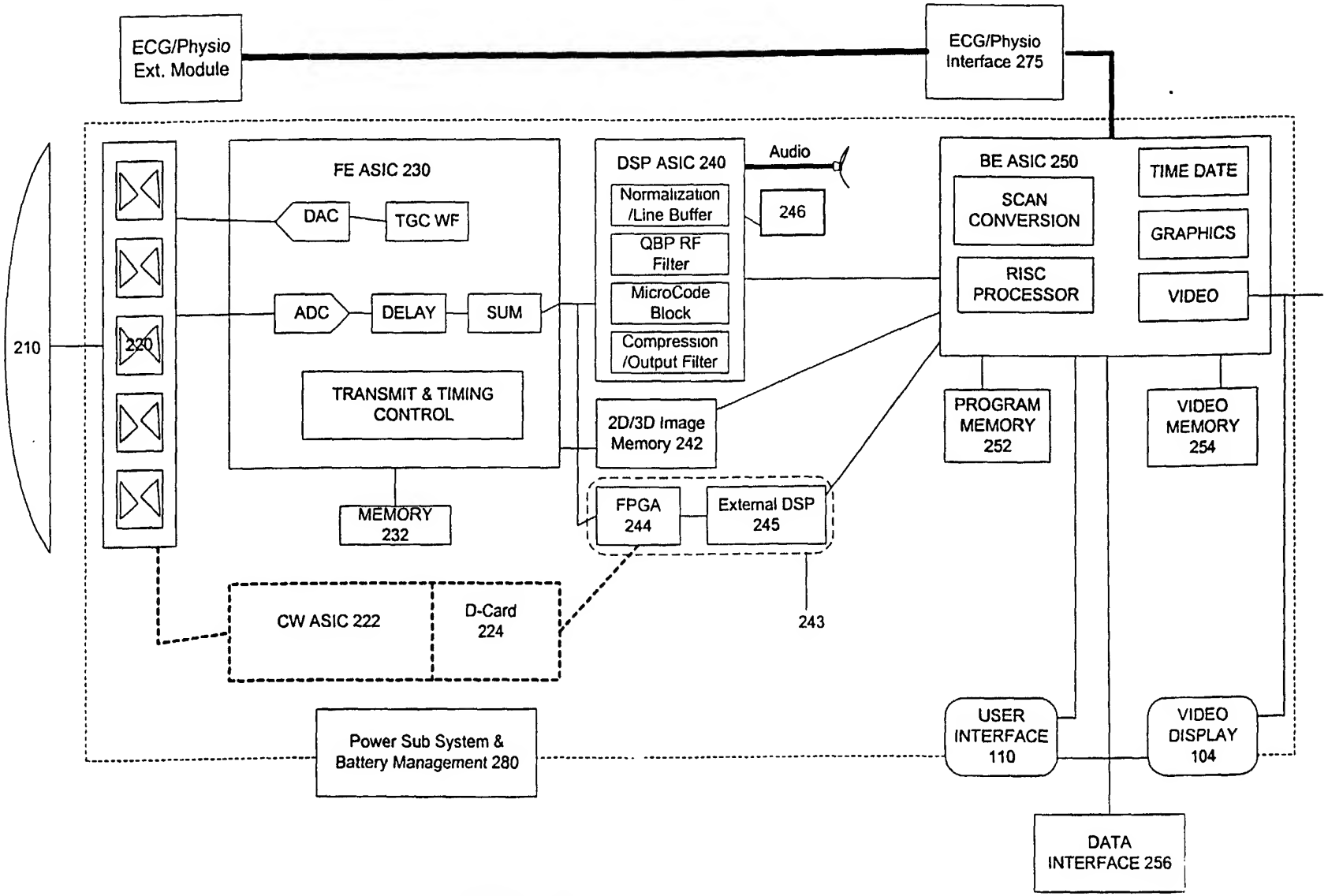

ECG/Physio Ext. Module
ECG/Physio Interface 275
210
220
FE ASIC 230
DAC
TGC WF
ADC
DELAY
SUM
TRANSMIT & TIMING CONTROL
MEMORY 232
DSP ASIC 240
Audio
Normalization /Line Buffer
246
QBP RF Filter
MicroCode Block
Compression /Output Filter
2D/3D Image Memory 242
FPGA 244
External DSP 245
243
BE ASIC 250
SCAN CONVERSION
RISC PROCESSOR
TIME DATE
GRAPHICS
VIDEO
PROGRAM MEMORY 252
VIDEO MEMORY 254
CW ASIC 222
D-Card 224
Power Sub System & Battery Management 280
USER INTERFACE 110
VIDEO DISPLAY 104
DATA INTERFACE 256

FIG 2

20T020"6ZT2990T

FIG. 3

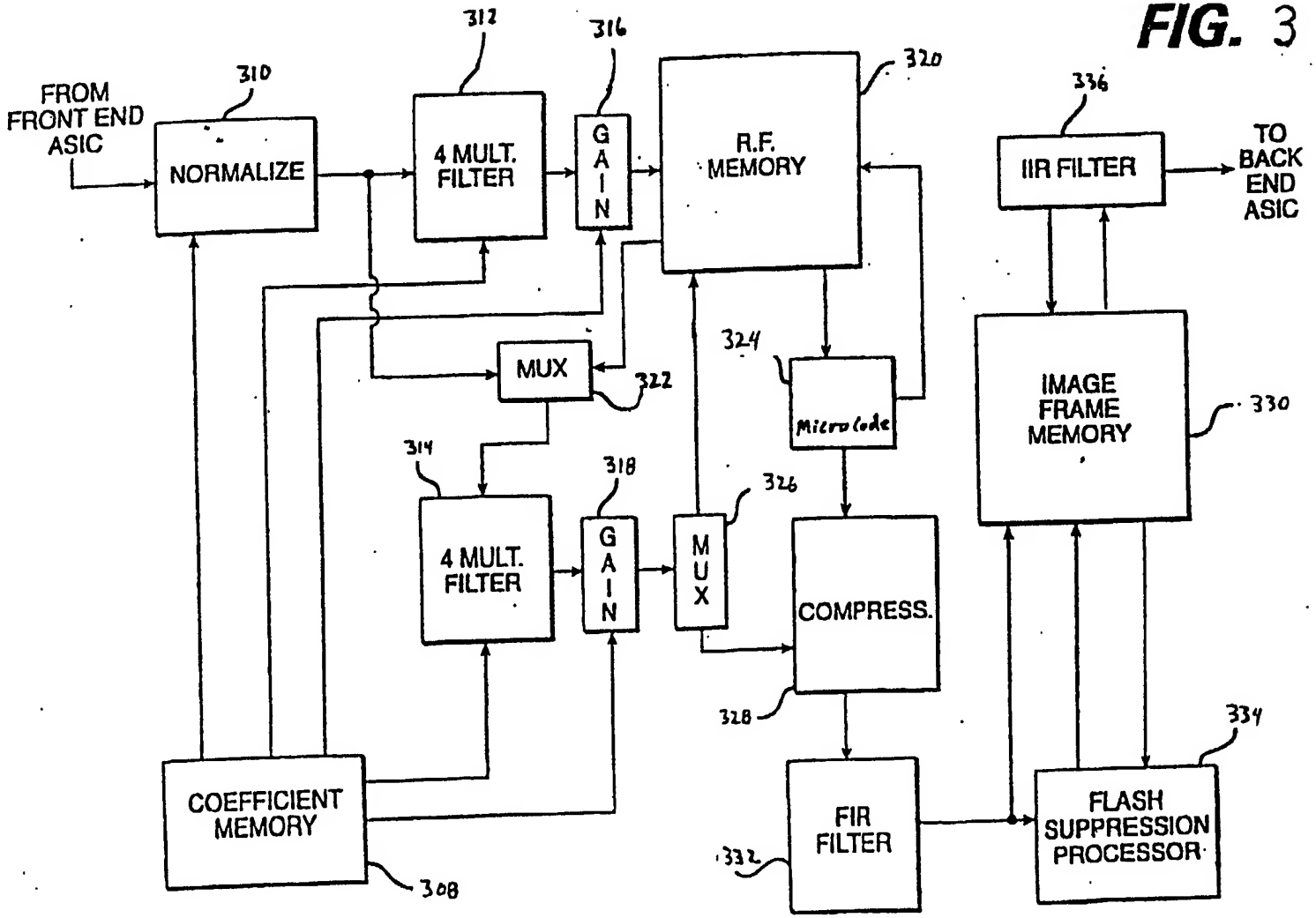


Fig. 4

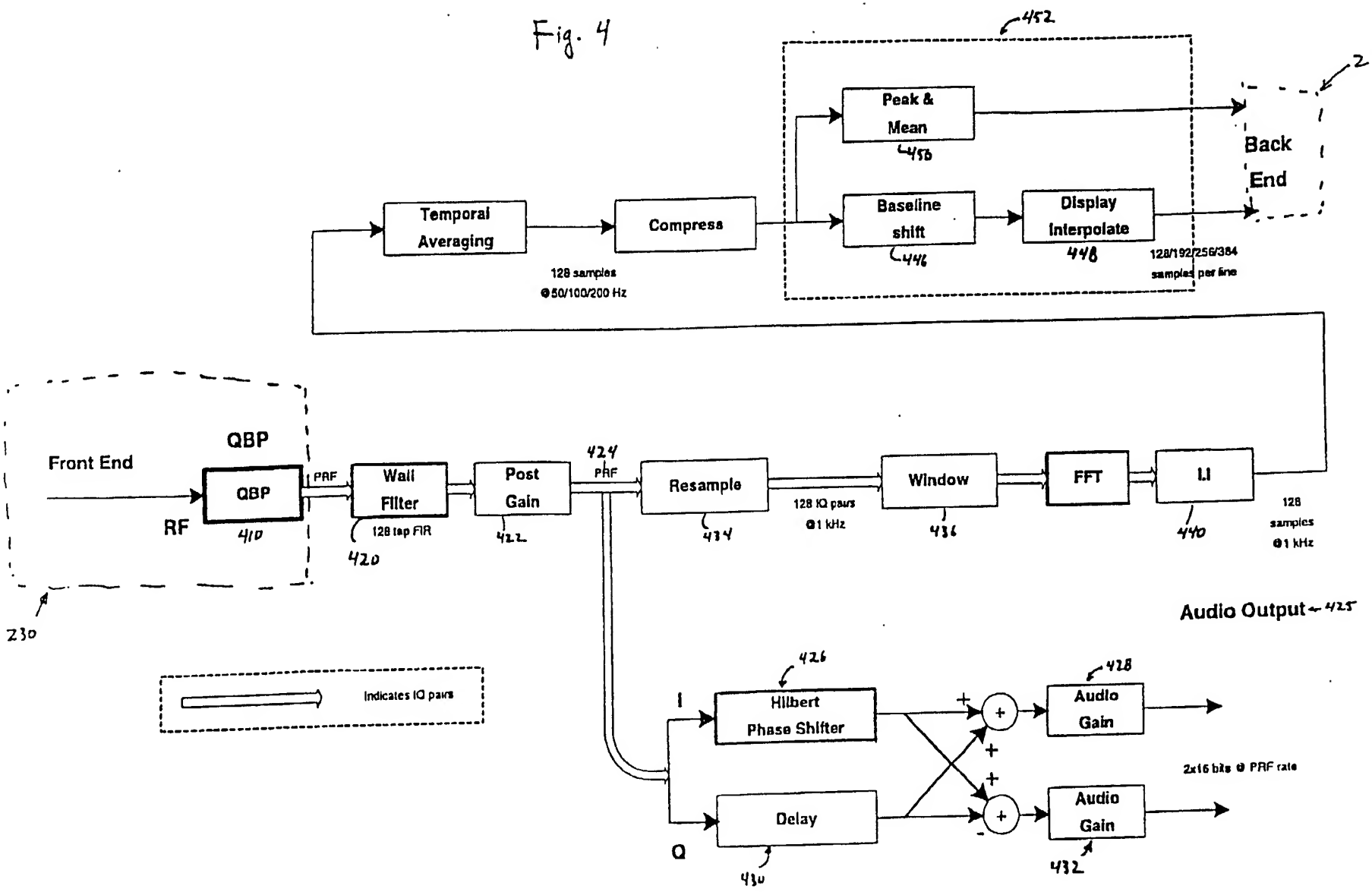
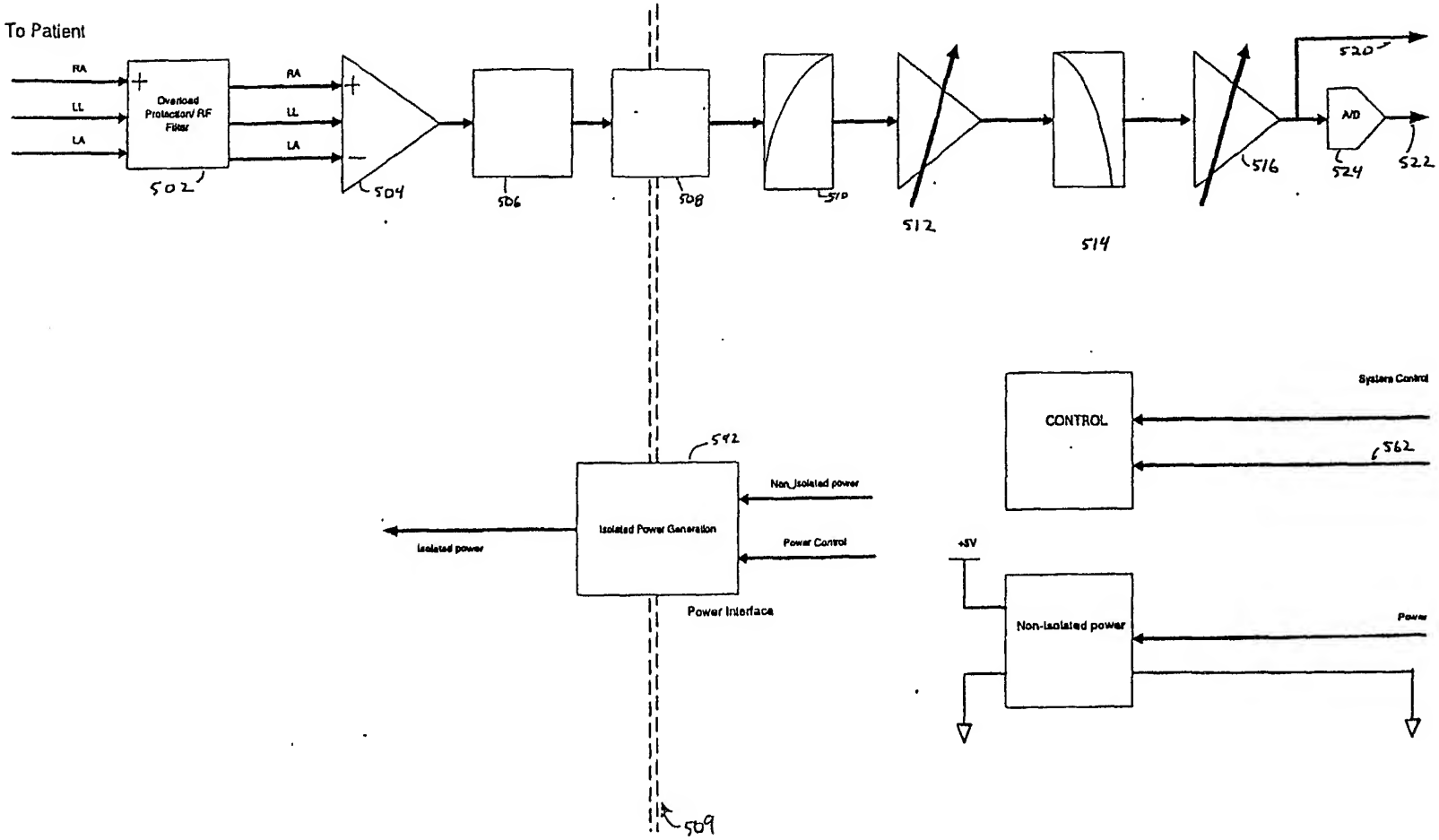

452
250
Peak & Mean
456
Back End
Temporal Averaging
Compress
Baseline shift
446
Display Interpolate
448
128/192/256/384 samples per line
128 samples @50/100/200 Hz
Front End
QBP
RF
410
PRF
Wall Filter
128 tap FIR
420
Post Gain
422
424
PRF
Resample
434
128 IQ pairs @1 kHz
Window
436
FFT
L.I
440
128 samples @1 kHz
230
Audio Output
425
Indicates IQ pairs
426
I
Hilbert Phase Shifter
Delay
Q
430
428
Audio Gain
2x16 bits @ PRF rate
Audio Gain
432

FIG. 5


To Patient
RA
LL
LA
Overload Protection/ RF Filter
502
RA
LL
LA
504
506
508
510
512
514
516
520
A/D
522
524
592
Non_Isolated power
Isolated Power Generation
Isolated power
Power Control
Power Interface
509
CONTROL
System Control
562
+5V
Non-Isolated power
Power

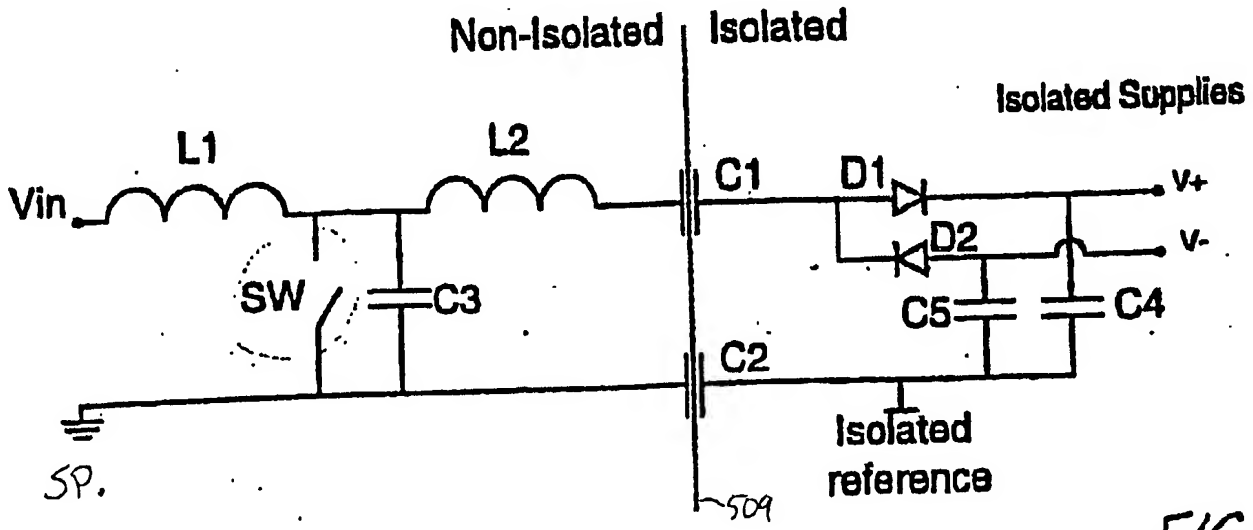

Non-Isolated
Isolated
Isolated Supplies
L1
L2
Vin
C1
D1
V+
D2
V-
SW
C3
C5
C4
C2
SP.
Isolated
reference
509

FIG. 6

Fig 7

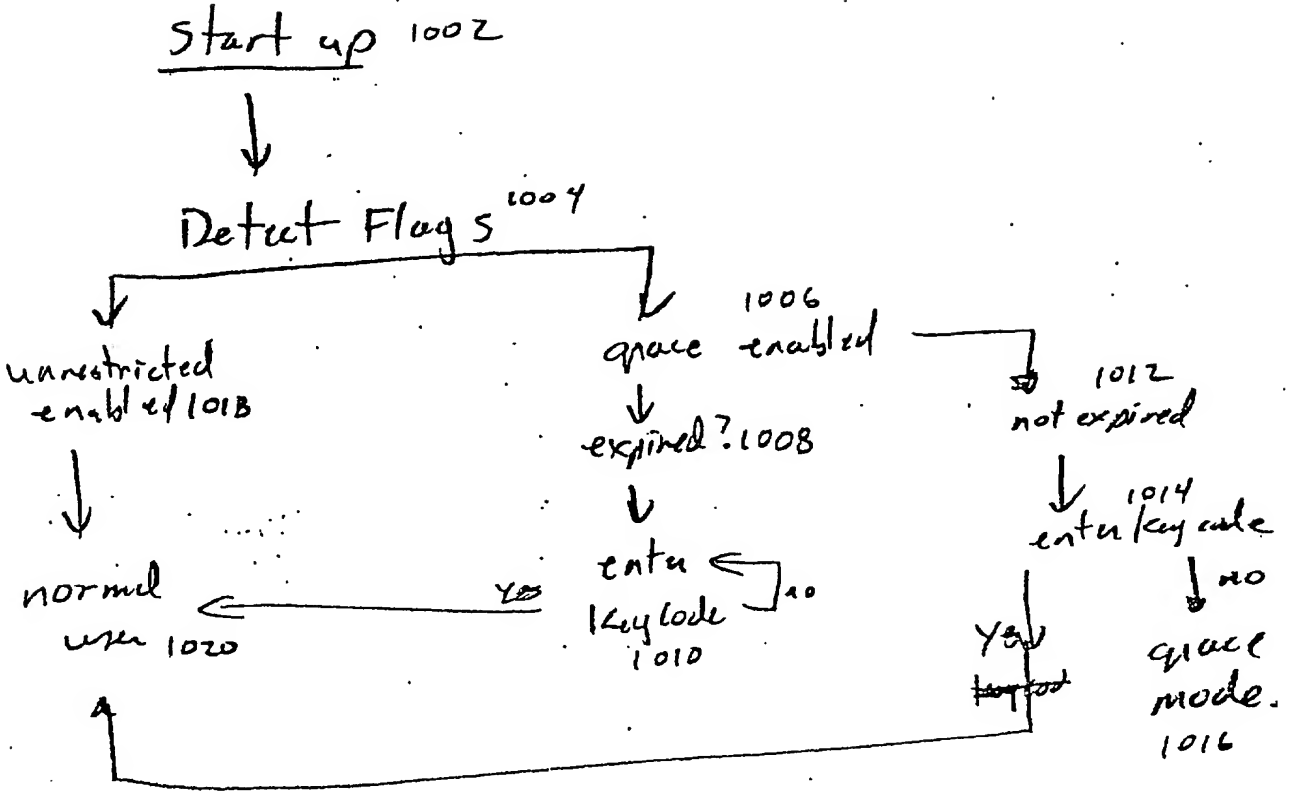

Start up 1002
Detect Flags 1004
unrestricted enabled 1018
grace enabled 1006
expired? 1008
not expired 1012
enter keycode 1014
enter keycode 1010
yes
no
normal use 1020
yes
no
grace mode. 1016

Fig 8

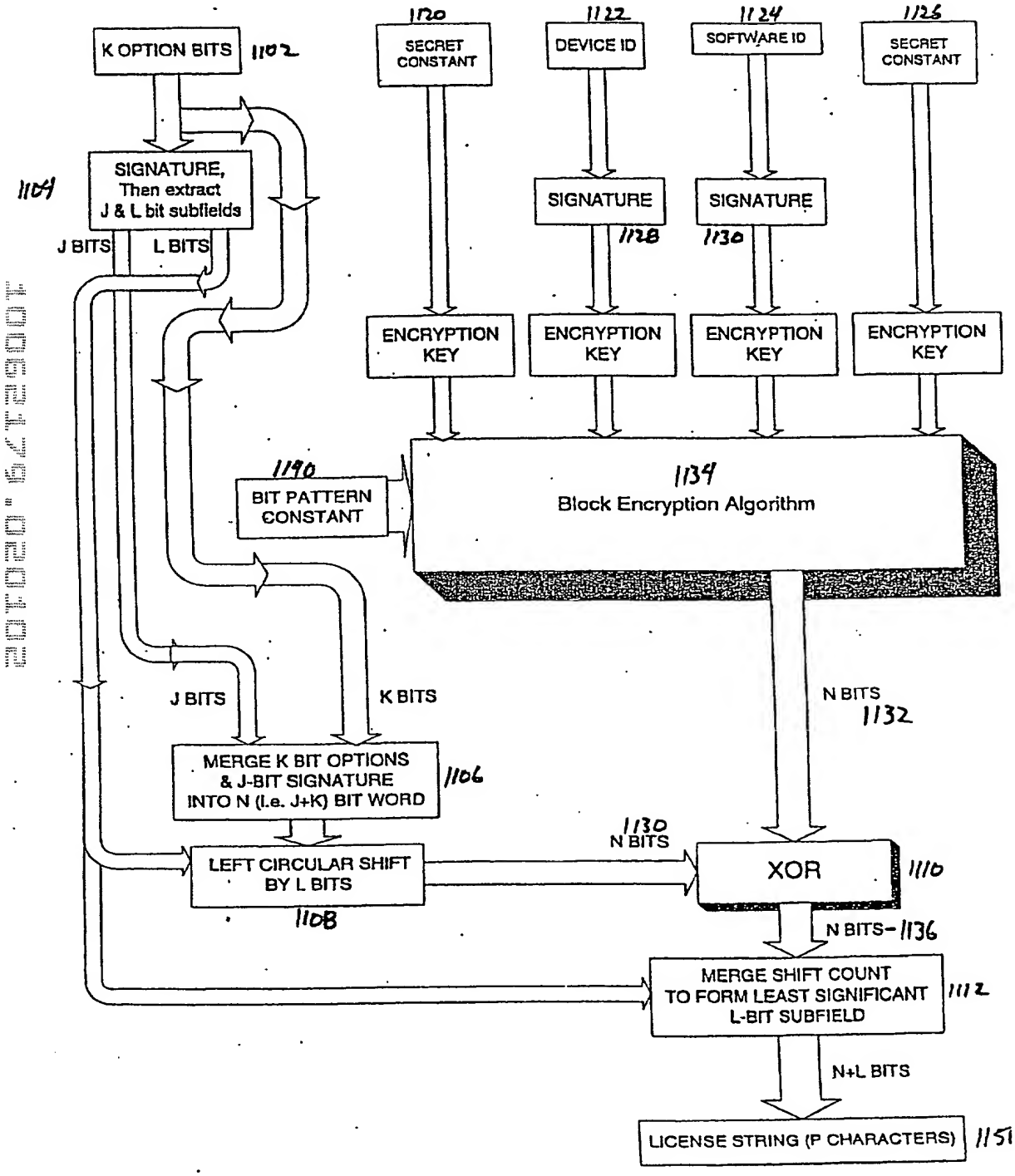

K OPTION BITS
1102
SECRET CONSTANT
1120
DEVICE ID
1122
SOFTWARE ID
1124
SECRET CONSTANT
1126
SIGNATURE, Then extract J & L bit subfields
1104
J BITS
L BITS
SIGNATURE
1128
SIGNATURE
1130
ENCRYPTION KEY
ENCRYPTION KEY
ENCRYPTION KEY
ENCRYPTION KEY
1190
BIT PATTERN CONSTANT
1134
Block Encryption Algorithm
J BITS
K BITS
N BITS
1132
MERGE K BIT OPTIONS & J-BIT SIGNATURE INTO N (I.e. J+K) BIT WORD
1106
1130
N BITS
LEFT CIRCULAR SHIFT BY L BITS
1108
XOR
1110
N BITS-1136
MERGE SHIFT COUNT TO FORM LEAST SIGNIFICANT L-BIT SUBFIELD
1112
N+L BITS
LICENSE STRING (P CHARACTERS)
1151

Fig. 9

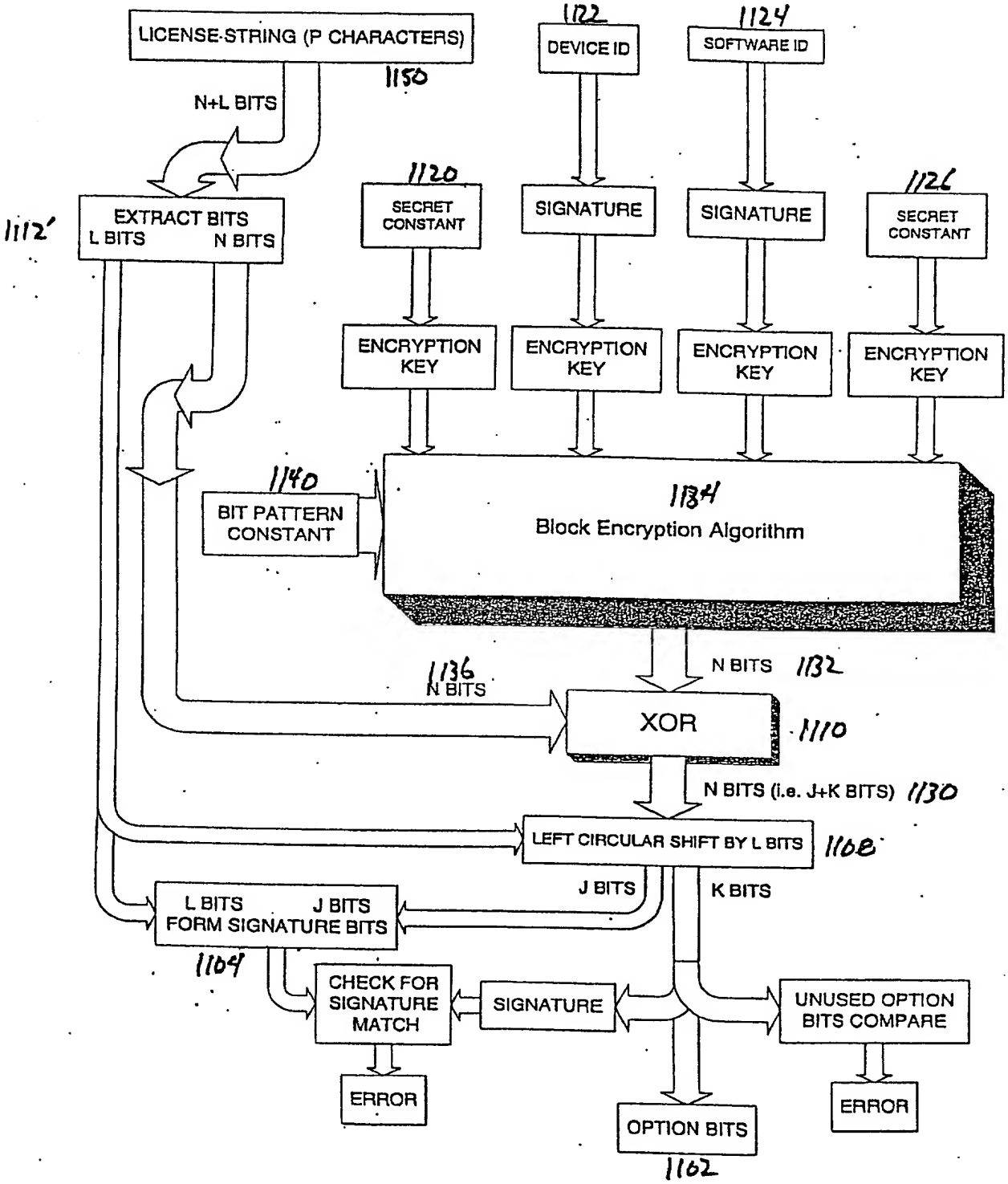
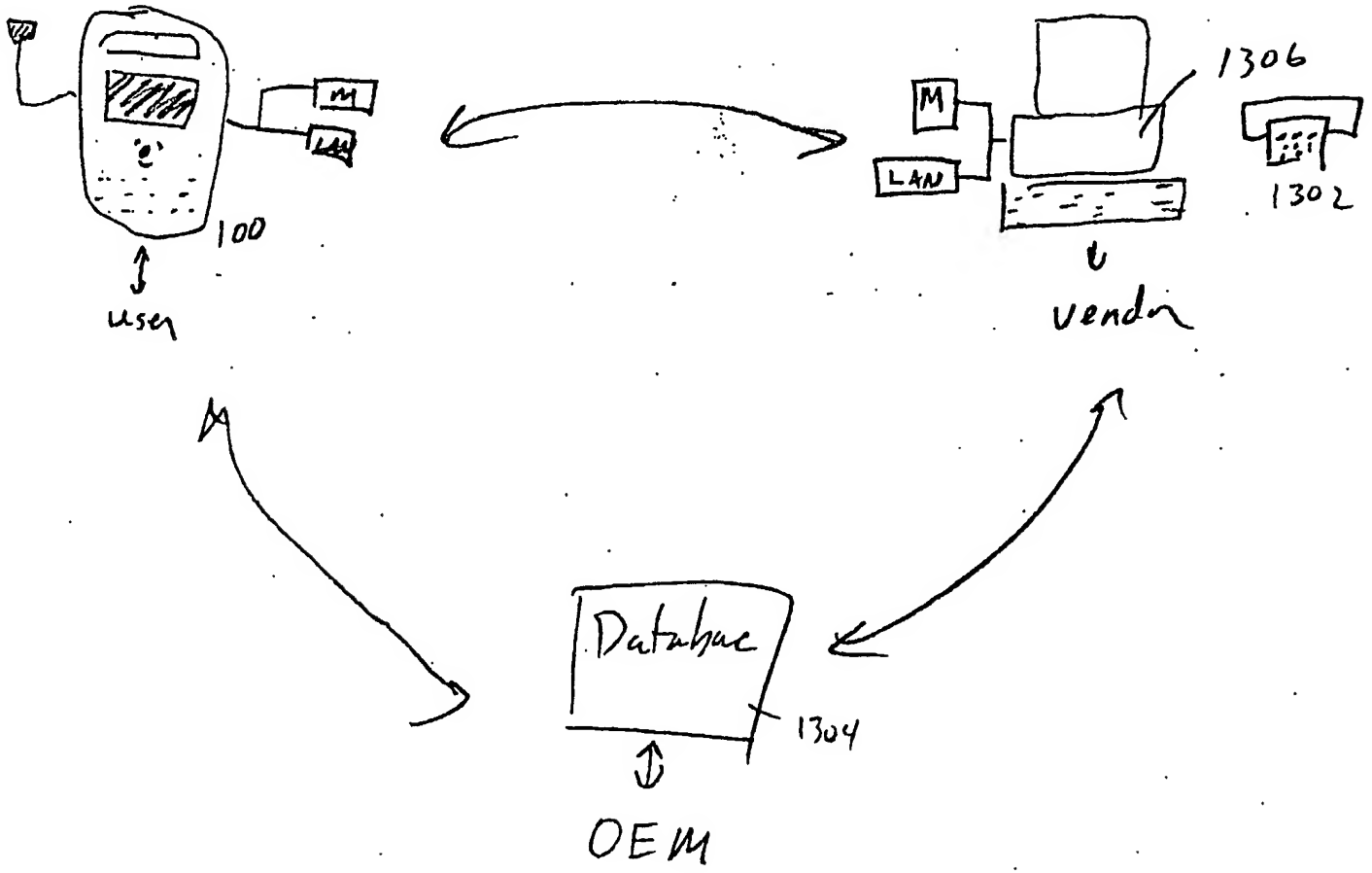

LICENSE-STRING (P CHARACTERS)
1150
N+L BITS
1122
DEVICE ID
1124
SOFTWARE ID
1120
SECRET CONSTANT
SIGNATURE
SIGNATURE
1126
SECRET CONSTANT
1112'
EXTRACT BITS
L BITS
N BITS
ENCRYPTION KEY
ENCRYPTION KEY
ENCRYPTION KEY
ENCRYPTION KEY
1140
BIT PATTERN CONSTANT
1134
Block Encryption Algorithm
N BITS
1132
1136
N BITS
XOR
1110
N BITS (i.e. J+K BITS)
1130
LEFT CIRCULAR SHIFT BY L BITS
1108
J BITS
K BITS
L BITS
J BITS
FORM SIGNATURE BITS
1109
CHECK FOR SIGNATURE MATCH
SIGNATURE
UNUSED OPTION BITS COMPARE
ERROR
OPTION BITS
1162
ERROR

Fig 10



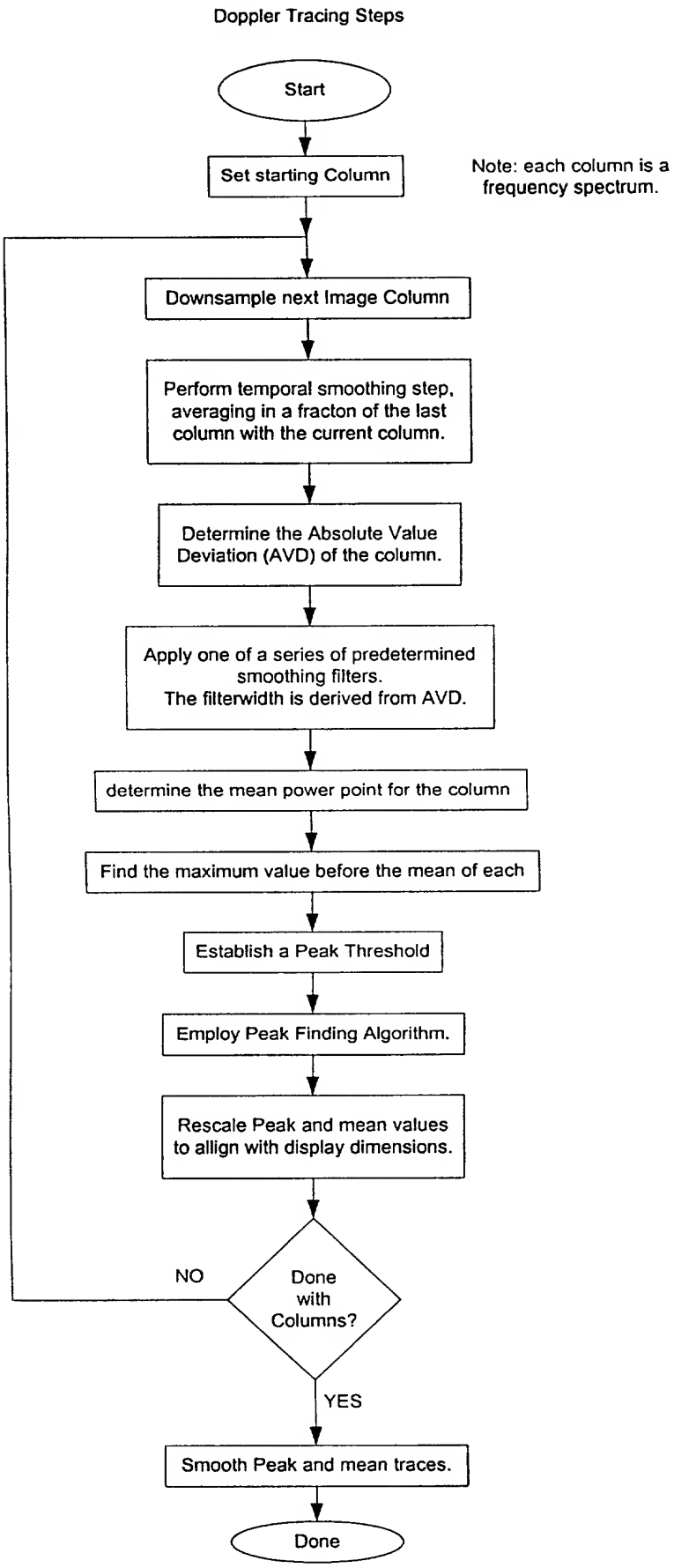

Doppler Tracing Steps
Start
Set starting Column
Note: each column is a frequency spectrum.
Downsample next Image Column
Perform temporal smoothing step, averaging in a fracton of the last column with the current column.
Determine the Absolute Value Deviation (AVD) of the column.
Apply one of a series of predetermined smoothing filters. The filterwidth is derived from AVD.
determine the mean power point for the column
Find the maximum value before the mean of each
Establish a Peak Threshold
Employ Peak Finding Algorithm.
Rescale Peak and mean values to allign with display dimensions.
NO
Done with Columns?
YES
Smooth Peak and mean traces.
Done

Fig 11

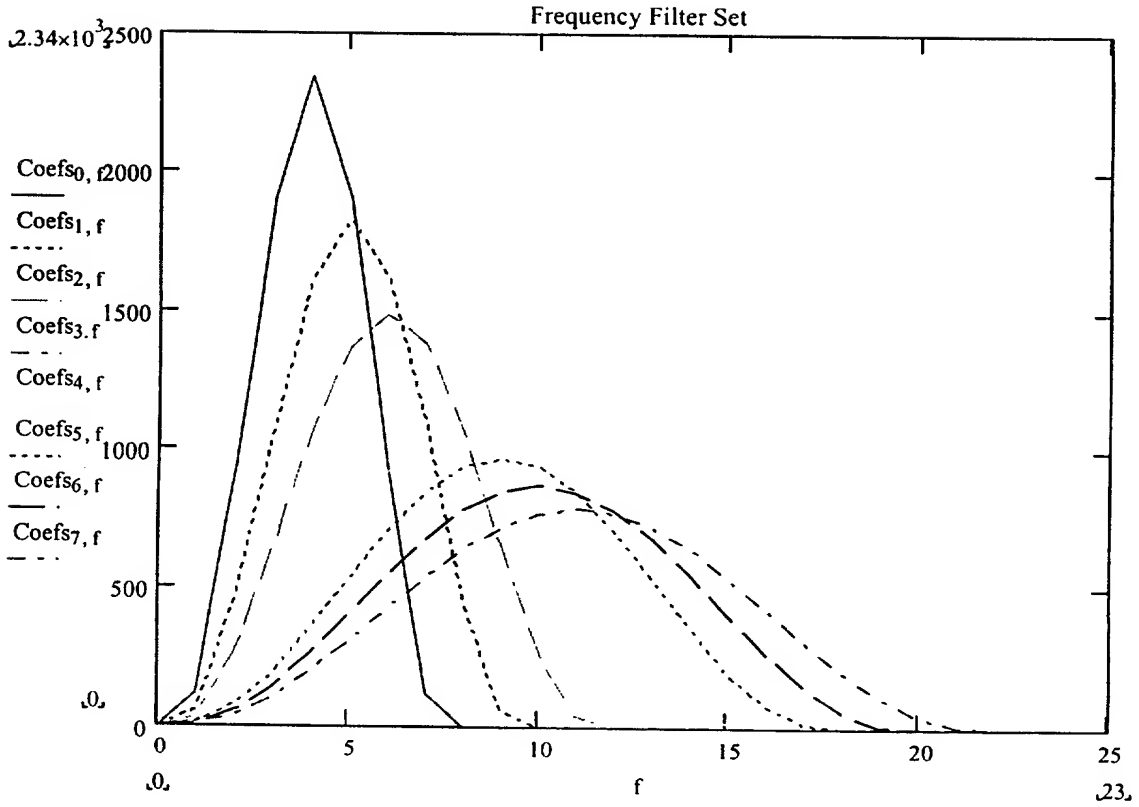

Frequency Filter Set
2.34×10^3
2500
2000
1500
1000
500
0
Coefs0, f
Coefs1, f
Coefs2, f
Coefs3, f
Coefs4, f
Coefs5, f
Coefs6, f
Coefs7, f
0
5
10
15
20
25
f

FIG. 12